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GRAIN DUST EXPLOSIONS

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U. S. Department of Agriculture

A radio talk by David J. Price, in charge, Chemical Engineering, Bureau of Chemistry and Soils, delivered at 1:38 p.m., E. S. T., Monday, July 1, 1929, through WRC and 17 other stations associated with the National Broadcasting Company.

Several times during the average year you unfold your morning paper as you take it out of the mail box and come on a front page headline that reads something like this:

HOLOCAUST IN FACTORY

Dust Blast
Kills 5; Sets
Plant Ablaze

From reading such stories as these, you probably have learned that dusts of various sorts, when mixed with air, form an explosive mixture and hence a menace to safety of workmen and property.

But not many of you, I'll venture to guess, consider the fact that a threshing machine is a miniature factory, with considerable danger of a dust explosion which can work havoc with your property.

We have studied these explosions and have records of such occurrences from every wheat growing section of the country. During one threshing season alone in the Pacific Northwest nearly 300 dust explosions and fires occurred. In many cases not only the machine was destroyed, but the sacked grain and the straw stack and in some places large areas of standing grain were burned. The property loss from these 300 dust explosions in the Pacific Northwest in one season amounted to about \$1,000,000. I have come up here to the broadcasting studio today to tell you what we have found out about how to avoid similar disasters.

Our investigations have shown that practically all of the grain dusts when scattered in the air make an explosive mixture, which can be ignited by a spark or a flame.

I don't need to tell any of you who have worked around threshing machines that there is plenty of dust in their vicinity. The result is that the explosion hazard is there too. The dust often is simply dry particles of chaff and straw. This type of dust is explosive under certain conditions, but it is not so dangerous as the highly "nervous" -- you might call it -- dust that hangs about the separator when you are threshing smutty wheat. Bunt or stinking smut leaves in the heads of ripened wheat smut balls holding millions of small spores or seeds. When the wheat is threshed, these balls break, and the spores are released.

The little particles make a highly explosive mixture with air. A spark or a flame will ignite smut dust quick as a flash -- and that's

just what you get -- a flash which has entirely too good a chance of starting a disastrous fire.

There are plenty of chances to get a spark to ignite the dust hanging in the air about a threshing machine. You know that static electricity accumulates on the machines unless they are grounded. This electricity is the same variety as that which you get on a cold, dry winter day by shuffling your feet on a good thick carpet. Friction produces it.

So it is apparent that you frequently have in threshing machines the conditions necessary for a dust explosion -- clouds of inflammable dust, mixed in the right proportion with air, and a source of ignition in the form of a heavy charge of static electricity on the machine. Naturally enough to prevent a dust explosion you will have to do one of three things: Eliminate the dust cloud, eliminate the source of ignition, or change the atmospheric conditions so that combustion cannot occur. We have found both of the first two ways to be practical. You can eliminate one of the principal sources of ignition, and you can collect at least a part of the dust and remove it from the interior of the machine.

If you operate a threshing machine, take no chances. Be especially careful if the weather is dry or the wheat is smutty. Then, no matter what the weather, remove the causes of dust explosions so far as possible, first by grounding the machine so that static electricity will not build up a heavy charge, and second, by using a suction fan to take the dust away from the air just above the cylinder.

To ground the machine connect all its moving parts by means of flexible insulated wire to a common ground wire attached to a metal rod driven at least 3 feet into the ground and kept well moistened.

We have found ungrounded machines which show a charge of 50,000 volts. Needless to say that's dangerous. But that sort of charge or any appreciable charge of static electricity will not build up if you use a properly arranged wiring system and see that positive contacts are maintained between the various parts of the machine and the ground rod.

To take away the dust, or a considerable part of it, mount a suction fan on the deck of the separator. Connect it by a belt to one of the pulleys on the side of the machine. The fan exhausts the dust laden air from above the cylinder and discharges it through a canvas hose to the base of the straw stack or some other point a safe distance from the operating machinery. The threshing crew will doubly appreciate a fan of this kind. It not only reduces the fire and explosion hazard, but it also improves working conditions. It helps the operator too because the workmen can see operating conditions and thus keep the machinery running more effectively.

So there are two precautions to observe in order to avoid one of those annoying and expensive dust explosions this threshing season. One, ground the threshing machine so that no static electricity will accumulate on it. Two, use a suction fan to take the dust laden air from above the cylinder and discharge it at a safe distance from the machine.

And if you really mean business about this, we can supply you with publications describing both the wiring system for grounding the machine, and the dust collecting fan. Just address your request to the United States Department of Agriculture and ask for Department Bulletin 379 and Department Circular 98.